

We claim:

1. A fusion protein for delivery of a compound of interest into a cell, comprising a membrane penetrating peptide attached to a compound of interest.

2. The fusion protein according to claim 1, wherein the membrane penetrating peptide is derived from a nuclear localization sequence, overlaps with a nuclear localization sequence of a mammalian or yeast protein or comprises a sequence  $-(X-X-X-X)_n-$  where n is an integer 1 to 7, and X each time is independently selected from the group consisting of arginine, histidine or lysine.

3. The fusion protein according to claim 2, wherein the nuclear localization sequence is derived from a nuclear protein or transcription factor.

4. The fusion protein according to claim 3, wherein the transcription factor is a Period protein.

5. The fusion protein according to claim 4, wherein the Period protein is a human Period protein.

6. The fusion protein according to claim 5, wherein the mammalian Period protein is human Period1 protein.

7. The fusion protein according to claim 2 wherein the membrane penetrating peptide comprises the sequence  $-(X-X-X-X)_n-$  where n is an integer 1 to 7, and X each time is independently selected from the group consisting of arginine, histidine or lysine.

8. The fusion protein according to claim 7, wherein n is an integer 1 to 4.

9. The fusion protein according to claim 8, wherein n is an integer 1 to 2.

10. The fusion protein according to claim 1, wherein the compound of interest is a peptide, protein, chemical entity, nucleic acid, or any modified form thereof.

11. A method of delivering a compound of interest into a cell, comprising contacting a cell with a fusion protein according to claim 1.

12. The method of delivering a compound of interest into a cell *in vitro*, comprising contacting a cultured cell with a fusion protein according to claim 1.

13. The method of delivering a compound of interest into a cell *ex vivo*, comprising contacting a cell with a fusion protein according to claim 1 and introducing the cell into the body of a patient.

14. The method of delivering a compound of interest into a cell *in vivo*, comprising administering to a patient a fusion protein according to claim 1.

15. A method for identifying a membrane penetrating peptide, wherein a peptide comprises a sequence  $-(X-X-X-X)_n-$  where n is an integer 1 to 7, and X each time is independently selected from the group consisting of arginine, histidine or lysine, by generating a conjugate peptide comprising the sequence  $-(X-X-X-X)_n-$  where n is an integer 1 to 7, and X each time is independently selected from the group consisting of arginine, histidine or lysine, with a detectable protein, adding the conjugate peptide exogenously to a cell and determining if the conjugated peptide is located within the cytoplasm and/or nucleus of the cell.

16. A method for identifying a membrane penetrating peptide, wherein a peptide comprises a sequence derived from or overlapping with a nuclear localization sequence of a mammalian or yeast protein, by generating a conjugate peptide comprising the part or all of the nuclear localization sequence with a detectable protein, adding the conjugate peptide exogenously to a cell and determining if the conjugated peptide is located within the cytoplasm and/or nucleus of the cell.

17. The method of delivering a compound of interest into a cell, comprising administering to a cell a fusion protein according to claim 1, wherein the membrane penetrating peptide comprises a sequence  $-(X-X-X-X)_n-$  where n is an integer 1 to 7, and X each time is independently selected from the group consisting of arginine, histidine or lysine.

18. A fusion protein for delivering a compound of interest into a cell, wherein the fusion protein comprises a membrane penetrating peptide comprising a sequence  $-(X-X-X-X)_n-$  where n is an integer 1 to 7, and X each time is independently selected from the group consisting of arginine, histidine or lysine, and a compound of interest.

19. The fusion protein of claim 18, wherein the compound of interest is directly chemically attached to the membrane penetrating peptide or by a linker.

20. The fusion protein of claim 19, wherein the linker is an amino acid linker or a polypeptide linker.

21. The fusion protein of claim 18, wherein the membrane penetrating protein is produced by recombinant technology, chemical synthesis or degradation of a precursor protein.